Measurement of Wide-Aperture X-ray Beam Trasverse Profile Based on Multiangular Wire Scanning

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Nowadays radiation sources are widely used in different investigations and technological applications, such as radiation therapy, sterilization of medical equipment, welding, microstructuring processes etc. It is necessary to control beam parameters in exploitation of devices designed for this purposes. One of the main parameter is the particle flux density distribution in a transverse plane of the beam.

Previously we suggested a new method for particle flux density distribution in a transverse plane of the beam. The method is based on mathematical reconstruction of experimental data, which is observed multiple beam scanning by thin strip under different angles.

In this work these method is tested experimentally. In the experiment, an X-ray tube is used as a radiation source, while thin scintillation strip as a sensitive scanning detector. In this strip, light photons is generated due to interaction with X-ray beam. These photons is guided by optical fiber to the photomultiplier. Scintillation strip moves in the plane, which is perpendicular to the beam propagation. Thus, we experimentally observe a set of registered photons intensity on strip location and angle orientation with particular angle step. These dependences is further used to reconstruct particle flux density distribution in a transverse plane of the beam.

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